

Memo: For the Record
 Date: January 7, 1970
 Re: Visit to U. S. Army Medical Research Laboratory
 Fort Knox, Kentucky, December 11, 1969

STAT [] The purpose of this visit was to establish liaison with [] head of the laboratory. [] has been active in applied visual research for more than 20 years, a large portion of which has been devoted to space perception. In particular, he has extensive experience with respect to three dimensional range finders. STAT

STAT [] has had no direct experience with image evaluation. He did, however, offer some interesting comments regarding three dimensional viewing devices. In particular, he related an experience in which his laboratory was asked to evaluate a three dimensional range finder for armored vehicles. The results of the study were published in terms of the probability of obtaining a "hit" under a standard set of conditions. Sometime later, the device was modified and "improved" and subjected to further analysis by [] who was employed in a different laboratory at Fort Knox. [] results, however, indicated a hit rate of less than one-quarter of those obtained by [] Subsequent analysis revealed that the improvements in the device had introduced a number of additional elements and consequently more lens-air surfaces. From this study, and others, [] concludes that the obtainment of stereopsis is inversely proportional to the number of elements in the optical system. STAT Interestingly enough, [] was confirmed independently by Dr. [] when I visited him at [] several weeks later. STAT

The implications of these results for the sponsor are quite clear. When we test for stereopsis, there are at the most a small number of optical elements in the system, e.g., the orthorater. However, in actual practice, with the instruments now in use, there are many more such elements which, as we know, may not always be in perfect adjustment. The implication is to test for stereopsis in the actual viewing situation, a procedure which is now in progress.

STAT [] also discussed a number of theoretical issues in space perception. His approach is very unconventional and difficult to follow in an initial verbal presentation. We should bear in mind, however, that this laboratory has been extremely productive of new ideas in space perception. For many years, [] STAT

STAT [] The notions describing the adjacency principal, equidistance tendency, etc., which are undoubtedly the newest and freshest ideas in space perception in a century have all emanated from this group. Although I do not fully understand [] position, which has not been published and which has only been suggested in a tentative manner by him during our visit, he does bear monitoring in the future. STAT

We also discussed problems associated with the use of reticles. Since optical range finders will soon be replaced by laser devices, this is no longer a current problem at Fort Knox. However, their experience would be well worth considering in relation to mensuration devices.

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[] has recently joined the staff at the laboratory. Dr. [] is interested in non-physiological effects on accommodation and supplied us with an informal paper he has written on this topic. He is particularly interested in what he calls the "Mandelbaum Phenomenon" in which subjects are unable to focus on a distant object while looking through a standard mesh screen located from 1.0 to 2.0 meters from the subject. No matter how hard the subject tries, the nearer accommodative stimulus overwhelms the more distant one in spite of the efforts on the part of the subject. It may well be that this represents the tendency to return to the resting position of the eye as described by [] and may in turn be related to the [] Law phenomenon described above.

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We agreed that it would be desirable to maintain liaison with [] and his laboratory. I have invited [] on their way to the Vision Committee meeting this spring (May 20-22).

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I feel that the most valuable contribution that [] might make to the sponsor's present problems are those relating to the design of reticles for mensuration. In this respect, he has had extensive experience with range finding devices and also has an excellent theoretical background which bears on the same problem. If the Vision Committee sponsors a working group on image evaluation, I would suggest that [] be asked to join.

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References

1. Asher, H. Experiments in Seeing, Basic Books, 1961. (In particular, design of stereoscope, pp. 176-191).
2. Mandelbaum, J. An Accommodation Phenomenon, Archives of Ophthalmology, 63, June, 1960, 923-926.
3. Gardner, Irvine, C. The Testing of Range Finders, J. Applied Physics, 19, August, 1948, 729-738.

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